



# HYDROGEN SULFIDE

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Agency for Toxic Substances and Disease Registry ToxFAQs

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This fact sheet answers the most frequently asked health questions (FAQs) about hydrogen sulfide. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Hydrogen sulfide occurs naturally and is also produced by human activities. Just a few breaths of air containing high levels of hydrogen sulfide gas can cause death. Lower, longer-term exposure can cause eye irritation, headache, and fatigue. This substance has been found in at least 24 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

## What is hydrogen sulfide?

(Pronounced hī'drə-jən sŭl'fīd')

Hydrogen sulfide occurs naturally in crude petroleum, natural gas, volcanic gases, and hot springs. It can also result from bacterial breakdown of organic matter. It is also produced by human and animal wastes.

Hydrogen sulfide can also result from industrial activities, such as food processing, coke ovens, kraft paper mills, tanneries, and petroleum refineries.

Hydrogen sulfide is a colorless, flammable gas under normal conditions. It is commonly known as hydrosulfuric acid, stink damp, and sewer gas. It smells like rotten eggs. People can smell it at low levels.

## What happens to hydrogen sulfide when it enters the environment?

- ☐ Hydrogen sulfide is released primarily as a gas and will spread in the air.
- ☐ When released as a gas, it will form sulfur dioxide and sulfuric acid in the atmosphere.
- ☐ Sulfur dioxide can be broken down further and is a major component in acid rain.

- ☐ Hydrogen sulfide remains in the atmosphere for about 18 hours.
- ☐ In some instances, it may be released as a liquid waste from an industrial facility.

## How might I be exposed to hydrogen sulfide?

- ☐ You can be exposed by crude petroleum, natural gas, volcanic gases, and hot springs.
- ☐ You can be exposed at work if you work in the petroleum refining, petrochemical, or natural gas industry; food processing; wastewater treatment; coke oven plants; tanneries; or pulp and paper mills.
- ☐ A small amount of hydrogen sulfide is produced by bacteria in your mouth and gastrointestinal tract and by enzymes in your brain and muscle.

## How can hydrogen sulfide affect my health?

Hydrogen sulfide is considered a broad-spectrum poison, meaning it can poison several different systems in the body.

Breathing very high levels of hydrogen sulfide can cause death within just a few breaths. There could be loss of consciousness after one or more breaths.

**ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>**

Exposure to lower concentrations can result in eye irritation, a sore throat and cough, shortness of breath, and fluid in the lungs. These symptoms usually go away in a few weeks. Long-term, low-level exposure may result in fatigue, loss of appetite, headaches, irritability, poor memory, and dizziness.

Animal studies showed that pigs that ate food containing hydrogen sulfide had diarrhea after a few days and weight loss after about 105 days.

### **How likely is hydrogen sulfide to cause cancer?**

Hydrogen sulfide has not been shown to cause cancer in humans. Its ability to cause cancer in animals has not been studied fully. The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have not classified hydrogen sulfide for carcinogenicity.

### **How can hydrogen sulfide affect children?**

Because it is heavier than air, hydrogen sulfide tends to sink, and because children are shorter than adults, they may be more likely to be exposed to larger amounts than adults in the same situations.

It is not known whether hydrogen sulfide can cause birth defects in people. Some animal studies have shown developmental problems from exposure to hydrogen sulfide.

### **How can families reduce the risk of exposure to hydrogen sulfide?**

Families may be exposed if they live near natural or industrial sources of hydrogen sulfide such as hot springs, or pulp and paper mills. Families may want to restrict visits to

these places.

### **Is there a medical test to show whether I've been exposed to hydrogen sulfide?**

In case of life-threatening hydrogen sulfide poisoning, measurements of blood sulfide or urinary thiosulfate levels may be used to confirm exposure. However, samples need to be taken within two hours of exposure to be useful.

### **Has the federal government made recommendations to protect human health?**

EPA has established that hydrogen sulfide is a regulated toxic substance and is a hazardous substance as defined under the Federal Water Pollution Control Act.

The Occupational Safety and Health Administration (OSHA) has established an acceptable ceiling concentration of 20 parts per million (20 ppm) in the workplace, with a maximum level of 50 ppm allowed for 10 minutes if no other measurable exposure occurs.

The National Institute of Occupational Safety and Health (NIOSH) recommends a maximum exposure level of 10 ppm.

### **Sources of Information**

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for hydrogen sulfide. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Animal testing is sometimes necessary to find out how toxic substances might harm people and how to treat people who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

